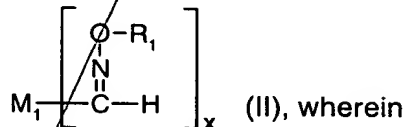
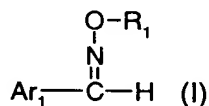


Patent Claims

1. Alkaline developable, photosensitive composition comprising

(A) at least one alkaline soluble binder resin, prepolymer or monomer component;

(B) at least one compound of formula I or II



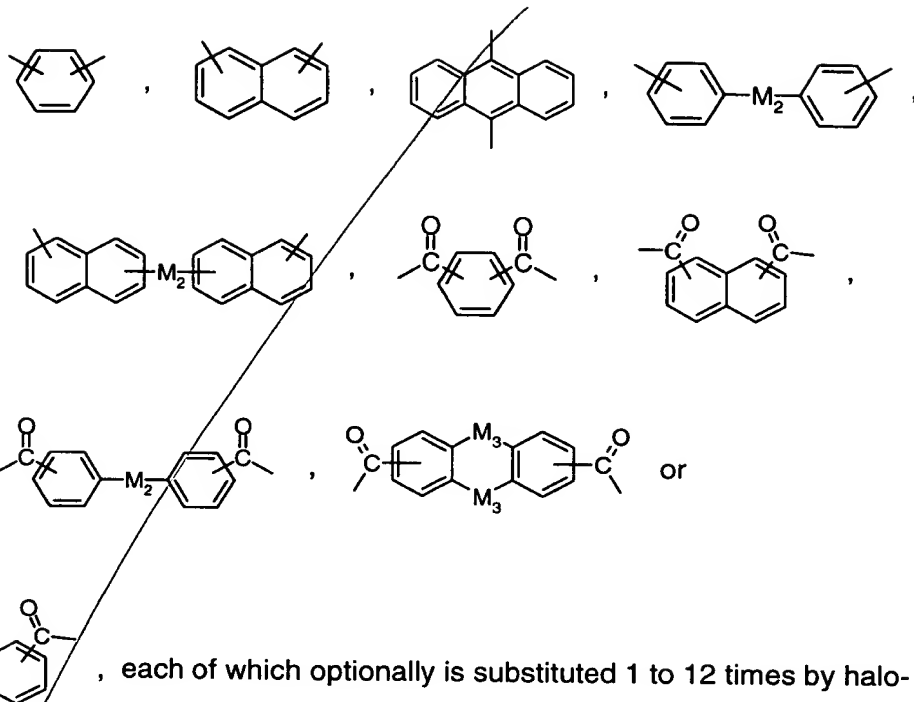
R₁ is C₄-C₉cycloalkanoyl, C₃-C₁₂alkenoyl; C₁-C₂₀alkanoyl which is unsubstituted or substituted by one or more halogen, CN or phenyl; or R₁ is benzoyl which is unsubstituted or substituted by one or more C₁-C₆alkyl, halogen, CN, OR₃, SR₄ or NR₅R₆; or R₁ is C₂-C₁₂alkoxycarbonyl or benzyloxycarbonyl; or phenoxy carbonyl which is unsubstituted or substituted by one or more C₁-C₆alkyl or halogen;

Ar₁ is C₆-C₂₀aryl or C₆-C₂₀aryloyl, both radicals are unsubstituted or substituted 1 to 12 times by halogen, C₁-C₂₀alkyl, benzyl, C₁-C₂₀alkanoyl, C₃-C₈cycloalkyl; or said C₆-C₂₀aryl or C₆-C₂₀aryloyl is substituted by phenyl or benzoyl each of which optionally is substituted by one or more OR₃, SR₄ or NR₅R₆; or said C₆-C₂₀aryl or C₆-C₂₀aryloyl is substituted by C₂-C₁₂alkoxycarbonyl optionally interrupted by one or more -O- and/or optionally substituted by one or more hydroxyl groups; or said C₆-C₂₀aryl or C₆-C₂₀aryloyl is substituted by phenoxy carbonyl, OR₃, SR₄, SOR₄, SO₂R₄ or NR₅R₆, wherein the substituents OR₃, SR₄ or NR₅R₆ optionally form 5- or 6-membered rings via the radicals R₃, R₄, R₅ and/or R₆ with further substituents on the aryl ring of the C₆-C₂₀aryl or C₆-C₂₀aryloyl group or with one of the carbon atoms of the aryl ring of the C₆-C₂₀aryl or C₆-C₂₀aryloyl group;

or Ar₁ is C₃-C₉heteroaryl, provided that R₁ is acetyl, said C₃-C₉heteroaryl is unsubstituted or substituted 1 to 7 times by halogen, C₁-C₂₀alkyl, benzyl, C₁-C₂₀alkanoyl, or C₃-C₈cycloalkyl; or said C₃-C₉heteroaryl is substituted by phenyl or benzoyl, each of which optionally is substituted by one or more OR₃, SR₄ or NR₅R₆; or said C₃-C₉heteroaryl is substituted by C₂-C₁₂alkoxycarbonyl optionally interrupted by one or more -O- and/or optionally substituted by one or more hydroxyl groups; or said C₆-C₂₀aryl or C₆-C₂₀aryloyl is substituted by phenoxy carbonyl, OR₃, SR₄, SOR₄, SO₂R₄ or NR₅R₆;

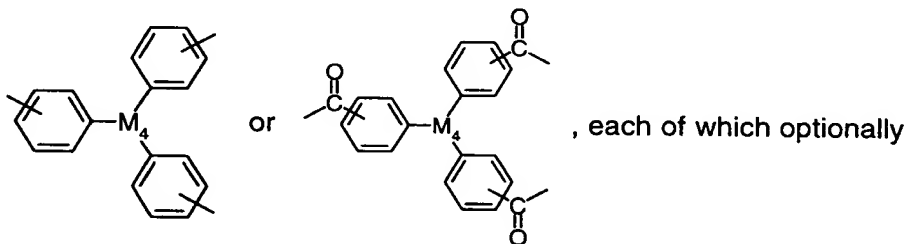
x is 2 or 3;

M₁ when x is 2, is



, each of which optionally is substituted 1 to 12 times by halogen, C₁-C₁₂alkyl, C₃-C₈cycloalkyl, benzyl; phenyl which is unsubstituted or substituted by one or more OR₃, SR₄ or NR₅R₆; benzoyl which is unsubstituted or substituted by one or more OR₃, SR₄ or NR₅R₆; C₁-C₁₂alkanoyl; C₂-C₁₂alkoxycarbonyl optionally interrupted by one or more -O- and/or optionally substituted by one or more OH, phenoxycarbonyl, OR₃, SR₄, SOR₄, SO₂R₄ or NR₅R₆;

or **M₁**, when x is 3, is


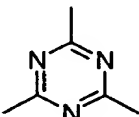
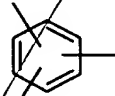


is substituted 1 to 12 times by halogen, C₁-C₁₂alkyl, C₃-C₈cycloalkyl; phenyl which is unsubstituted or substituted by one or more OR₃, SR₄ or NR₅R₆; benzyl, benzoyl, C₁-C₁₂alkanoyl; C₂-C₁₂alkoxycarbonyl optionally interrupted by one or more -O- and/or optionally substituted by one or more hydroxyl groups, phenoxycarbonyl, OR₃, SR₄, SOR₄, SO₂R₄ or NR₅R₆;

M₂ is a direct bond, -O-, -S-, -SS-, -NR₃-, -(CO)-, C₁-C₁₂alkylene, cyclohexylene, phenylene, naphthylene, -(CO)O-(C₂-C₁₂alkylene)-O(CO)-, -(CO)O-(CH₂CH₂O)_n-(CO)- or -(CO)-

(C₂-C₁₂-alkylene)-(CO)-; or M₂ is C₄-C₁₂alkylene or C₄-C₁₂alkylenedioxy-, each of which is optionally interrupted by 1 to 5 -O-, -S- and/or -NR₃-;

M₃ is a direct bond, -CH₂-, -O-, -S-, -SS-, -NR₃- or -(CO)-;

M₄ is , , or  ;

R₃ is hydrogen or C₁-C₂₀alkyl; or R₃ is C₂-C₁₂alkyl which is substituted by -OH, -SH, -CN, C₃-C₆alkenoxy, -OCH₂CH₂CN, -OCH₂CH₂(CO)O(C₁-C₄alkyl), -O(CO)-C₁-C₄alkyl, -O(CO)-phenyl, -(CO)OH, -(CO)O(C₁-C₄alkyl), -N(C₁-C₄alkyl)₂, -N(CH₂CH₂OH)₂, -N[CH₂CH₂O-(CO)-C₁-C₄alkyl]₂ or morpholinyl; or R₃ is C₂-C₁₂alkyl which is interrupted by one or more -O-; or R₃ is -(CH₂CH₂O)_{n+1}H, -(CH₂CH₂O)_n(CO)-C₁-C₈alkyl, C₁-C₈alkanoyl, C₃-C₁₂alkenyl, C₃-C₆alkenoyl, C₃-C₈cycloalkyl; or R₃ is benzoyl which is unsubstituted or substituted by one or more C₁-C₆alkyl, halogen, -OH or C₁-C₄alkoxy; or R₃ is phenyl or naphthyl each of which is unsubstituted or substituted by halogen, -OH, C₁-C₁₂alkyl, C₁-C₁₂alkoxy, phenyl-C₁-C₃-alkoxy, phenoxy, C₁-C₁₂alkylsulfanyl, phenylsulfanyl, -N(C₁-C₁₂alkyl)₂, diphenylamino or -(CO)R₇; or R₃ is phenyl-C₁-C₃alkyl, or Si(C₁-C₆alkyl)_r(phenyl)_{3-r};

r is 0, 1, 2 or 3;

n is 1 to 20;

R₄ is hydrogen, C₁-C₂₀alkyl, C₃-C₁₂alkenyl, C₃-C₈cycloalkyl, phenyl-C₁-C₃alkyl; C₂-C₈alkyl which is substituted by -OH, -SH, -CN, C₃-C₆alkenoxy, -OCH₂CH₂CN, -OCH₂CH₂(CO)O(C₁-C₄alkyl), -O(CO)-C₁-C₄alkyl, -O(CO)-phenyl, -(CO)OH or -(CO)O(C₁-C₄alkyl); or R₄ is C₂-C₁₂alkyl which is interrupted by one or more -O- or -S-; or R₄ is -(CH₂CH₂O)_{n+1}H, -(CH₂CH₂O)_n(CO)-C₁-C₈alkyl, C₂-C₈alkanoyl, C₃-C₁₂alkenyl, C₃-C₆alkenoyl; or R₄ is phenyl or naphthyl each of which is unsubstituted or substituted by halogen, C₁-C₁₂alkyl, C₁-C₁₂alkoxy or -(CO)R₇;

R₅ and R₆ independently of each other are hydrogen, C₁-C₂₀alkyl, C₂-C₄hydroxyalkyl, C₂-C₁₀alkoxyalkyl, C₃-C₅alkenyl, C₃-C₈cycloalkyl, phenyl-C₁-C₃alkyl, C₁-C₄alkanoyl, C₃-C₁₂alkenoyl, benzoyl; or are phenyl or naphthyl each of which is unsubstituted or substituted by C₁-C₁₂alkyl or C₁-C₁₂alkoxy; or R₅ and R₆ together are C₂-C₆alkylene optionally interrupted by -O- or -NR₃- and/or optionally substituted by hydroxyl, C₁-C₄alkoxy, C₂-C₄alkanoyloxy or benzoyloxy;

all

R₇ is hydrogen, C₁-C₂₀alkyl; or is C₂-C₈alkyl which is substituted by halogen, phenyl, -OH, -SH, -CN, C₃-C₆alkenoxy, -OCH₂CH₂CN, -OCH₂CH₂(CO)O(C₁-C₄alkyl), -O(CO)-C₁-C₄alkyl, -O(CO)-phenyl, -(CO)OH or -(CO)O(C₁-C₄alkyl); or **R₇** is C₂-C₁₂alkyl which is interrupted by one or more -O-; or **R₇** is -(CH₂CH₂O)_{n+1}H, -(CH₂CH₂O)_n(CO)-C₁-C₈alkyl, C₃-C₁₂alkenyl, C₃-C₈cycloalkyl; phenyl optionally substituted by one or more halogen, -OH, C₁-C₁₂alkyl, C₁-C₁₂alkoxy, phenoxy, C₁-C₁₂alkylsulfanyl, phenylsulfanyl, -N(C₁-C₁₂alkyl)₂, or diphenylamino; and

(C) a photopolymerizable compound.

2. Photosensitive composition according to claim 1, wherein compound (A) is an oligomeric or polymeric compound.

3. Photosensitive composition according to claim 2, wherein the photopolymerizable compound (C) is a liquid.

4. Photosensitive composition according to claim 1, wherein component (B) is a compound of formula I or II, wherein

R₁ is C₂-C₆alkanoyl or C₂-C₅alkoxycarbonyl; or **R₁** is benzoyl which is unsubstituted or substituted by one or more C₁-C₆alkyl or halogen;

Ar₁ is phenyl or naphthyl,

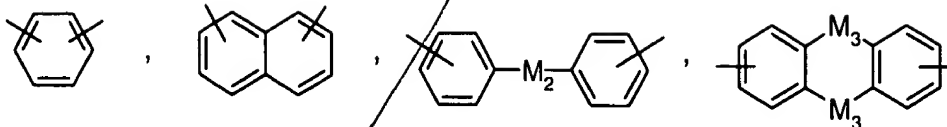
for a2

each of these radicals is unsubstituted or substituted 1 to 5 times by halogen, C₁-C₂₀alkyl, benzyl or C₁-C₂₀alkanoyl; or said phenyl or naphthyl is substituted by phenyl or benzoyl, each of which optionally is substituted by one or more OR₃, SR₄ or NR₅R₆; or said phenyl or naphthyl is substituted by C₂-C₁₂alkoxycarbonyl optionally interrupted by one or more -O- and/or optionally substituted by one or more OH; or said phenyl or naphthyl is substituted by OR₃, SR₄ or NR₅R₆, wherein the substituents OR₃, SR₄ or NR₅R₆ optionally form 5- or 6-membered rings via the radicals R₃, R₄, R₅ and/or R₆ with further substituents on the phenyl or naphthyl ring or with one of the carbon atoms of the phenyl or naphthyl ring;

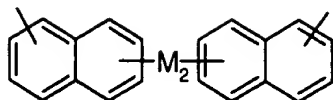
or **Ar₁** is furyl, pyrrolyl, thienyl, benzofuranyl, indolyl, benzothiophenyl or pyrridyl, provided that **R₁** is acetyl; wherein each of these radicals is unsubstituted or substituted 1 to 4 times by halogen, C₁-C₂₀alkyl, benzyl, C₃-C₈cycloalkyl, phenyl, C₁-C₂₀alkanoyl, benzoyl, C₂-C₁₂alkoxycarbonyl, phenoxycarbonyl, OR₃, SR₄, SOR₄, SO₂R₄ or NR₅R₆;

x is 2;

M₁ is a group



or



, each of which optionally is substituted 1 to 4 times by

halogen, C₁-C₁₂alkyl, benzyl, OR₃, SR₄ or NR₅R₆; or by phenyl which is unsubstituted or substituted by one or more OR₃, SR₄ or NR₅R₆; or by benzoyl which is unsubstituted or substituted by one or more OR₃, SR₄ or NR₅R₆; or by C₁-C₁₂alkanoyl; or by C₂-C₁₂alkoxycarbonyl optionally interrupted by one or more -O- and/or optionally substituted by one or more hydroxyl groups;

M₂ is a direct bond, -O-, -S-, -SS-, -NR₃-, -(CO)-, C₁-C₁₂alkylene, phenylene, -(CO)O-(C₂-C₁₂alkylene)-O(CO)-, -(CO)O-(CH₂CH₂O)_n-(CO)- or -(CO)-(C₂-C₁₂alkylene)-(CO)-; or M₂ is C₄-C₁₂alkylene or C₄-C₁₂alkylenedioxy-, each of which is optionally interrupted by 1 to 5 -O-, -S- and/or -NR₃-;

M₃ is a direct bond, -CH₂-, -O-, -S-, -NR₃- or -(CO)-;

R₃ is hydrogen or C₁-C₂₀alkyl; or R₃ is C₂-C₁₂alkyl which is substituted by -OH, -SH, -O(CO)-C₁-C₄alkyl, -O(CO)-phenyl, -(CO)O(C₁-C₄alkyl), -N(C₁-C₄alkyl)₂, -N(CH₂CH₂OH)₂, -N[CH₂CH₂O-(CO)-C₁-C₄alkyl]₂ or morpholinyl; or R₃ is C₂-C₁₂alkyl which is interrupted by one or more -O-; or R₃ is -(CH₂CH₂O)_{n+1}H, -(CH₂CH₂O)_n(CO)-C₁-C₈alkyl, phenyl-C₁-C₃alkyl, C₂-C₈alkanoyl, C₃-C₁₂alkenyl or C₃-C₆alkenoyl; or R₃ is benzoyl which is unsubstituted or substituted by one or more C₁-C₆alkyl, halogen or C₁-C₄alkoxy; or R₃ is phenyl or naphthyl each of which is unsubstituted or substituted by halogen, C₁-C₁₂alkyl, C₁-C₁₂alkoxy, phenyl-C₁-C₃-alkoxy, phenoxy, C₁-C₁₂alkylsulfanyl, phenylsulfanyl, -N(C₁-C₁₂alkyl)₂, diphenylamino or -(CO)R₇;

n is 1 to 20;

R₄ is hydrogen, C₁-C₂₀alkyl, C₃-C₁₂alkenyl, phenyl-C₁-C₃alkyl; C₂-C₈alkyl which is substituted by -OH, -SH, -O(CO)-C₁-C₄alkyl, -O(CO)-phenyl or -(CO)O(C₁-C₄alkyl); or R₄ is C₂-C₁₂alkyl which is interrupted by one or more -O- or -S-; or R₄ is -(CH₂CH₂O)_{n+1}H, -(CH₂CH₂O)_n(CO)-C₁-C₈alkyl, C₂-C₈alkanoyl, C₃-C₁₂alkenyl, C₃-C₆alkenoyl; or R₄ is phenyl or naphthyl each of which is unsubstituted or substituted by halogen, C₁-C₁₂alkyl, C₁-C₁₂alkoxy

R₅ and **R₆** independently of each other are hydrogen, C₁-C₂₀alkyl, C₂-C₄hydroxyalkyl, C₂-C₁₀alkoxyalkyl, phenyl-C₁-C₃alkyl, C₁-C₄alkanoyl, C₃-C₁₂alkenoyl, benzoyl; or are phenyl or naphthyl each of which is unsubstituted or substituted by C₁-C₁₂alkyl or C₁-C₁₂alkoxy; or **R₅** and **R₆** together are C₂-C₆alkylene optionally interrupted by -O- or -NR₃- and/or optionally substituted by hydroxyl, C₁-C₄alkoxy, C₂-C₄alkanoyloxy or benzoyloxy; and

R₇ is hydrogen, C₁-C₂₀alkyl; or is C₂-C₈alkyl which is substituted by halogen, phenyl, -OH, -SH, C₃-C₆alkenoxy, -O(CO)-C₁-C₄alkyl, -O(CO)-phenyl or -(CO)O(C₁-C₄alkyl); or **R₇** is C₂-C₁₂alkyl which is interrupted by one or more -O-; or **R₇** is -(CH₂CH₂O)_{n+1}H, -(CH₂CH₂O)_n(CO)-C₁-C₈alkyl or C₃-C₁₂alkenyl; or is phenyl optionally substituted by one or more halogen, C₁-C₁₂alkyl, C₁-C₁₂alkoxy, phenoxy, C₁-C₁₂alkylsulfanyl, phenylsulfanyl, -N(C₁-C₁₂alkyl)₂, or diphenylamino.

5. Photosensitive composition according to claim 1, wherein component (B) is a compound of formula I or II, wherein

R₁ is C₂-C₄alkanoyl;

Ar₁ is phenyl or naphthyl, each of which is unsubstituted or substituted by halogen, C₁-C₈alkyl, NR₅R₆ or OR₃, wherein the substituents OR₃, optionally form 5- or 6-membered rings via the radicals R₃ with further substituents on the phenyl or naphthyl ring; or **Ar₁** is 2-furyl, 2-pyrrolyl, 2-thienyl, 3-indolyl, provided that R₁ is acetyl;

M₁ is  ;

x is 2;

R₃ is C₁-C₂₀alkyl; or **R₃** is C₂-C₁₂alkyl which is substituted by OH, -O(CO)-C₁-C₄alkyl, -N(C₁-C₄alkyl)₂, -N(CH₂CH₂OH)₂, -N[CH₂CH₂O-(CO)-C₁-C₄alkyl or morpholinyl]; or **R₃** is C₂-C₁₂alkyl which is interrupted by one or more -O-; or **R₃** is -(CH₂CH₂O)_{n+1}H or -(CH₂CH₂O)_n(CO)-C₁-C₄alkyl;

n is 1 to 3; and

R₅ and **R₆** are C₁-C₄alkyl.

6. Photosensitive composition according to claim 1, wherein the oligomer or polymer (A) is a binder polymer.

7. Photosensitive composition according to claim 6, wherein the binder polymer is a copolymer of (meth)acrylate and (meth)acrylic acid, or a resin obtained by the reaction of a saturated or unsaturated polybasic acid anhydride with a product of the reaction of an epoxy compound and an unsaturated monocarboxylic acid, or is an addition product formed between a carboxyl group-containing resin and an unsaturated compound having an α,β -unsaturated double bond and an epoxy group.

8. Photosensitive composition according to claim 1, which additionally to the components (A), (B) and (C) comprises at least one photosensitizer compound (D).

Sub
a3
9. Photosensitive composition according to claim 7, comprising 100 parts by weight of component (A), 0.015 to 120 parts by weight of component (B), 5 to 500 parts by weight of component (C) and 0.015 to 120 parts by weight of component (D).

10. Photosensitive composition according to claim 1, comprising further additives (E), which are selected from the group consisting of epoxy compounds, thermal polymerization inhibitors, inorganic fillers, colourants, epoxy curing agents, amines, chain transfer agents, thermal radical initiators, photoreducible dyes, optical brighteners, thickeners, antifoaming agents and leveling agents, in particular inorganic fillers.

11. Photosensitive composition according to claim 1, additionally comprising an epoxy compound which contains at least two epoxy groups in the molecule.

12. Solder resist comprising a composition according to claim 1.

13. Color filter resist comprising a composition according to claim 1.

14. Process for the photopolymerization of compounds containing ethylenically unsaturated double bonds, which comprises irradiating a composition according to claim 1 with electromagnetic radiation in the range from 150 to 600 nm.

15. Coated substrate which is coated on at least one surface with a composition according to claim 1.

16. Process for the production of relief images, wherein a coated substrate according to claim 15 is subjected to imagewise exposure with electromagnetic radiation in the range from 150 to 600 nm, and then the unexposed portions are removed with a solvent.

17. A color filter prepared by providing red, green and blue (RGB) color elements and, optionally a black matrix, all comprising a photosensitive composition according to claim 1 and a pigment on a transparent substrate and providing a transparent electrode either on the surface of the substrate or on the surface of the color filter layer.

18. Process for forming images, wherein

- (1) the components of a composition according to claim 1 are mixed,
- (2) the resulting composition is applied to the substrate,
- (3) the solvent, if present, is evaporated, at elevated temperature,
- (4) the coated substrate is patternwise exposed to irradiation,
- (5) the irradiated sample is developed with aqueous alkaline solution, thereby removing the uncured areas and
- (6) the sample is thermally cured.